

# SAFETY INVESTIGATION OF BOATING ACCIDENT



BOAT 710C  
TRIADELPHIA LAKE

JULY 18, 2012

Captain Jerry A. Warren

## Summary

On Wednesday July 18, 2012 during a practical training session of Montgomery County's "Still Water Boat Operation" class at Triadelphia Lake, Boat 710C (rescue sled) flipped over with three personnel on board. The event was not part of the training exercise, and resulted in a personal injury and \$7117.63 in property loss.

Notifications were made and this report is an account of the ensuing investigation and recommendations by the Safety Section. Immediate incident fact finding was conducted and reporting was completed.

Given the fact of personal injury in this setting, the Fire Chief requested a comprehensive investigation to be performed. The investigation was conducted by Capt. Jerry A. Warren (Safety 700A).

## Experience and Training –

**Lead Instructor** – A Lieutenant with 31 years of fire service, 21 years of river and water rescue experience with Montgomery County Fire and Rescue Services. Training includes: Rescue 3's Swift Water Technician and Swift Water Boat Operators Courses, Boat Based Flood Operators Class, Department of Natural Resources (DNR) Boat Operators Class, and Instructor certification through the International Rescue Instructors Association.

**Boat 710C Instructor** – A Captain with 14 years of fire service, 11 years of river and water rescue experience, and 6 years as a MICRB certified instructor with Montgomery County Fire and Rescue Service. Training includes all the Montgomery County Fire and Rescue in house requirements to be a swift water boat operator.

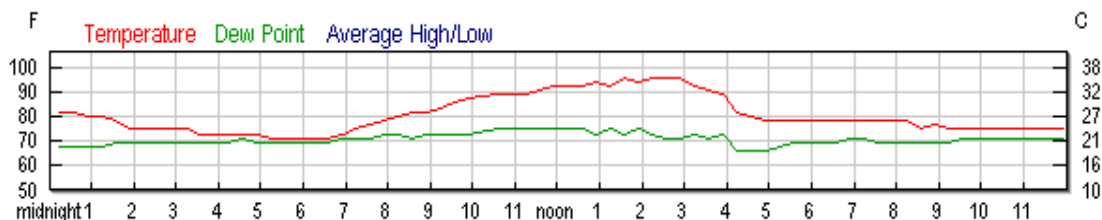
**Boat 710C Operator (trainee)** – A Lieutenant with 12 years of experience with Montgomery County Fire and Rescue Service.

**Boat 710C Crew (trainee)** – A FF3 with 5 years experience with Montgomery County Fire and Rescue Service.

## Triadelphia Lake –

The Triadelphia Lake, also called the Triadelphia Reservoir, is on the Patuxent River in Howard and Montgomery Counties, near Brookville. The reservoir was created in 1943 by the construction of the Brighton Dam on the Patuxent; it has a surface area of 800 acres and average water depth of 52 feet. The reservoir is maintained as a drinking-water source by the Washington Suburban Sanitary Commission (WSSC), which provides public recreational facilities on portions of the Triadelphia property.

## Weather – Data for July 18, 2012 from wunderground.com



### Calculate Heat Index for Fahrenheit (using Dew Point)

Enter Air Temperature in number of degrees Fahrenheit:

91

Enter Dew Point (°F):

75

102.65 °

Fahrenheit

59.59 %

Relative Humidity

Reset

The weather this day was clear and sunny. The temperature at 1130 hours was 91 degrees with a dew point of 75 degrees, resulting in a heat index of 102.65 degrees. Winds were calm at 2 – 5 mph.

## Sequence of Events

The Montgomery County Still Water Boat Course being led by **Lead Instructor** and assisted by **Boat 710C Instructor** and FF3 [REDACTED], was conducted for the personnel at stations 25 and 40 at the request of the Special Operations Chief. The Still Water Boat Course is designed as a two-day class. A decision was made to compress the two days into one long day, operating from 0800 – 2300 hours. July 18, 2012, was the scheduled day for “A” shift personnel. The crews assembled and met at the boat launch at the end of Triadelphia Lake Road.

The high temperature and resulting heat index forecasted for this day played a role in the decision to alter the normal class schedule by going on the water before classroom instruction. The boats to be used in the training (Boat 725, Boat 740, and Boat 710C) were inspected prior to being deployed for the training exercise. No mechanical defects were noted.

**Lead Instructor** assembled the class to brief them on the day’s activities and expectations. All apparatus (pontoon inflation, motor and fuel) and safety equipment (helmets and PFD’s) were checked by the class before leaving the launch area. Other water rescue equipment normally assigned to the boats was removed from the boats to facilitate the training class.

Boat 725 with **Boat 710C Instructor**, **Boat 710C Operator (trainee)** and **Boat 710C Crew (trainee)** was launched along with Boat 740, the second boat. **Lead Instructor** remained at the boat launch to deliver didactic training to remaining personnel, utilizing Boat 710C as a prop.

Boat 725 was operated by a trainee and was on the water for about fifteen minutes when it developed engine problems and began overheating. Boat 725 headed back to the boat launch to get Boat 710C to complete the training. The crew stated that they quickly changed equipment over to make up for lost time. During the change-over of equipment, the instructor’s personal

cell phone fell into the lake. Boat 710C then headed back out to continue training with **Boat 710C Instructor** and students, comprised of **Boat 710C Operator (trainee)** and **Boat 710C Crew (trainee)**.

Boat 710C was heading towards Brighton Dam as the instructor was talking the operator through different boat maneuvers, including “S” and “J” turns. Teaching different maneuvers is part of the normal program of instruction. After about 10 – 15 minutes, Boat 710C reached a wide area of the lake and started to perform “S” turns (there was confusion between instructor and students regarding the definition of both “S” and “J” turns). The difference in terminology and their understanding of that terminology was derived from their statements and follow - up interviews. Each one had a different response when they were asked to explain the maneuver they were performing at the time of the event. They were into the second turn when the boat started lifting, even after **Boat 710C Operator (trainee)** stated “he let off the throttle”, and continued until it had flipped side over side. The instructor, realizing that flipping was inevitable, shouted for the crew to make sure they cleared the propeller. All 3 personnel were ejected from the boat. In addition, equipment, and personal items in the boat were also ejected into the water. An unsuccessful attempt was made to retrieve the equipment. The lost equipment includes:

- A county portable radio with remote mic - \$6776.94
- A pair of sunglasses - \$191.53
- A leather radio pouch with strap with anti-sway stabilizer - \$89.16
- A Gerber Multi-plier - \$60.00

As a result of this event, the additional cost of providing maintenance and operational servicing of Boat 710C’s motor (\$384.50) is included here to indicate a total financial expenditure (injury costs are not included).

The operator was wearing the kill switch lanyard and when it was disconnected the engine stopped as designed. The instructor, uninjured, checked on the crew and found that **Boat 710C Crew (trainee)** was unhurt but **Boat 710C Operator (trainee)** had pain in his right forearm. They could not right the boat and started paddling it toward a nearby sandbar, approximately 150 – 200 feet away. As they arrived at the sandbar the second boat which had seen B710C overturned, reached them. They all worked together and righted Boat 710C and towed it back to the boat launch.

**Lead Instructor** was made aware of what occurred and Capt. Justin Meyer made notification to B/C 704, who in-turn notified Safety 700. **Boat 710C Operator (trainee)** was medically assessed and transported to Montgomery General Hospital by A725. SA700 responded to perform the initial investigation and arrived as the last boat was being removed from the water.

SA700 took a picture of Boat 710C on the trailer, as taking a picture of the accident scene was impossible. Written statements from **Boat 710C Instructor**, **Boat 710C Crew (trainee)** and **Lead Instructor** were obtained. Training was discontinued, and all units went to station 40 to clean up and perform other aspects of the class after lunch. SA700 went to Montgomery General to check on and interview **Boat 710C Operator (trainee)**.

## **Interviews**

The interviews were conducted according to personnel availability on July 24, 27, and 30, 2012 by SA700. In-county subject matter experts (MFF Donnie Simmons, Capt. Robert Hough and Capt. Dave Pazos) were consulted regarding boat dynamics and their thoughts on the information obtained from the written statements and interviews. In addition, at the request of SA700, MFF Simmons during a normal river training session attempted to duplicate the event. Multiple attempts were made using different personnel positions and varying the boat speed to duplicate the boat dynamics that Boat 710C experienced on 07/18/12. All attempts were unsuccessful.

Mr. Dave Demaree of Demaree Inflatable Boats, the manufacturer of Boat 710C, was consulted and asked to provide his professional opinion on this event. He stated “he has never seen nor heard of one of his inflatable boats flipping over” especially in this manner. He also stated “the facts, as given, just don’t add up.”

## **Contributing Factors**

The following items were identified as contributing factors leading up to the boat over turning:

- Course syllabus is flawed; it is confusing as written and the way it is designed. Half of the students are out on the water without any understanding of basic terms, definitions or principles that would be given during a classroom session. Also this class deviated from the course syllabus by condensing a two day class into one day.
- No SOG’s or SOP’s with regard to still water Boat Operations. - This would enable the course and or a graduate of this class to have direction, consistency, and safety while performing these skills.
- Position of personnel – based on the statements and interviews of the personnel involved, in the incident, there is a discrepancy of the positioning of the boat crew. Two personnel stated that two of the crew were sitting on the starboard pontoon and one was sitting on the port pontoon. The other person stated there were two on the port side and one person was on the starboard side.
- The investigation has not been able to determine whether speed was a factor. All involved personnel’s statements regarding speed were different.
- Type of maneuver being performed – “S”, tight”S”, “J” turn. There was confusion among students as to what they actually were doing at the time. Each of them had a different understanding of the maneuver performed at the time of accident.
- The operator of the boat stated that the instructor made a movement to the other side to try and offset the action of the boat. The instructor stated that he did not make any movement. The other student did not have any recollection of this taking place. The movement of personnel could affect the dynamics of the stability of the boat.
- No time requirement as crew or operator before being checked off as an operator, such as a minimum number of hours as crew before moving to operator trainee. In addition, a required minimum number of hours under supervision to be qualified as an operator.
- The MCFRS Still Water Boat Course has a requirement for a written test on the didactic material and a test on trailer-towing, but no test at all on boat operations.

- Practical skills should be demonstrated by an instructor before a student is asked to perform those skills. In addition, all students should have didactic taught before the practical is performed so that all involved are on the same page.

## Conclusion

Based on inspection of the boat and motor, mechanical factors for the over-turning of the boat were ruled out. It is determined that several human factors contributed to Boat 710C over-turning.

1. The crew, trying to make up for lost time, quickly through the process of switching over to another boat. The short cuts taken in this process and having no formal pre-launch checklist, contributed to the events that followed.
2. MCFRS Instructor I & II class utilize IFSTA's Fire and Emergency Services Instructor book (seventh edition) which teaches that a student best learns by the consistent way they gather information:
  - Hearing the information (Didactic sessions)
  - Seeing the information (Videos and demonstrations).
  - Participation (Hands-on performance of the skill demonstrated)

The cone of learning illustrates the percentage of information retained supporting this style of learning. This teaching method was not utilized and could be one of the factors that contributed to the event.

3. The failure to provide basic knowledge that would be obtained from a didactic session prior to performing practical skills is believed to have contributed to ambiguity regarding terms, definitions, goals and expectations for all involved.
4. On several issues, personnel had a different view, thought or perception as to where people were, what they were doing at the time, what happened, etc. This hindered the investigation as no clear actions could be determined.
5. No SOG's or SOP's. This put all personnel involved at a significant disadvantage by not having clearly defined expectations, in writing, as what they will be qualified to do once completing the course.
6. No specific course curriculum – The course has the Swift Water lesson plans used as the lesson plans for the Still Water Boat Course. Though they may be similar, there needs to be specific lesson plans for the “Still Water Boat Course.” This will allow for consistent teaching of the required material.
7. Skills were performed by students without being shown those skills by an instructor.

## Recommendations

1. Discontinue all non-swift water boat training until a program is developed that complies with NFPA1006, NFPA1670, and Maryland Department of Natural Resources (DNR) requirements.
2. State Law requires all persons born on or after July 1, 1972, to complete an approved Boating Safety Education Class.
3. All Fire & Rescue vessels must be registered with the State of Maryland if it is equipped with any kind of primary or auxiliary mechanical propulsion and is used in Maryland, per Maryland State Law.
4. Develop prerequisites for training to include watermanship skills per NFPA1006 and/or NFPA1670. The students had no requirement to show competency in their ability to swim. NFPA requires this for other water rescue skills and should be applied here.
5. Develop a Department standard for the Still Water Boat Course, this will include the tenants of NFPA1006 - *Standard for Technical Rescuer Professional Qualifications*, NFPA1670 - *Standard on Operations and Training for Technical Search and Rescue Incidents*, and the *Maryland State Boating Act*. This would encompass requirements to be considered for this class, what skills and knowledge will be required to demonstrate at the conclusion of the class. Develop a testing program to evaluate the student's competencies in all phases of the Still Water Boat Course, including the classroom and practical portions of the class. Deliver the practical portions of the course in a manner that the students are shown the skills by the instructor, and then allowed to perform that skill under supervision of the instructor.
6. Develop an updated course syllabus to provide for a didactic lesson before going out on the water and/or performing any practical skills.
7. All MCFRS personnel operating boats or operating as a boat crew member must be trained to this newly developed Standard.
8. Develop SOP's or SOG's for boat operations. Separation of Swift water and Still water must be clear and each shall have their own SOP's or SOG's in which to operate under. An alternative would be to train all water rescue personnel to one standard, thus eliminating confusion.
9. Develop a recertification or continuing education program for boat operators and boat crew members, particularly as it relates to those personnel not assigned to the Water Rescue Team.
10. Develop a pre-launch check sheet to ensure personnel safety and prevent damage or loss. A check list would ensure that all equipment is present, in working order and secure, and that all safety systems are present and in working order.
11. Assign a qualified person to handle the task of Safety Officer as set forth in NFPA standards.
12. Provide students a clear expectation as to their responsibilities with regard to operating a boat after successful completion of the class.
13. Increase class time to allow for added items and requirements.
14. Never condense a class just to get it in. This is not safe for the personnel especially if they have to finish the shift. 8 hours (investigator's opinion based on experience) should be the maximum time expected for one to be able to focus and learn.